

WHAT IS CLAIMED IS:

1 1. A cardiac electrode deployment device comprising:
2 a support; and
3 an electrode structure deployable from the support, said electrode structure
4 including a planar region and a conformable, raised center region, wherein electrode surfaces
5 on the planar region and on the center region are electrically isolated from each other.

1 2. A device as in claim 1, wherein the electrode structure comprises an
2 electrically conductive base and an electrically conductive dome attached to an electrically
3 insulative spacer from the base.

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1 3. A device as in claim 2, wherein the electrically conductive base is a
2 compliant web and the conductive dome is a soft matrix attached to and projecting from the
3 web.

1 4. A device as in claim 3, wherein the electrode structure can be shifted
2 between a low profile configuration where it can be intercostally introduced to a region over
3 the heart and an open configuration where the electrode surfaces can be engaged against the
4 heart.

1 5. A device as in claim 4, wherein support comprises a shaft having a
2 proximal end and a distal end and the electrode structure comprises a plurality of struts
3 reciprocatably attached to the distal end of the shaft, said struts being retractable to a radially
4 contracted configuration and advancable along arcuate, diverging paths to deploy the
5 electrode surfaces to non-traumatically engage the heart when advanced thereagainst,
6 wherein the compliant web is secured to the struts to advance the electrode surfaces when the
7 struts are advanced.

1 6. A device as in claim 5, wherein the compliant web is supported solely
2 by the struts and the dome is supported solely by the web.

1 7. A device as in claim 1, further comprising a non-conductive, fixed rod
2 which is coupleable to the center region and advancable from a distal end of the support to
3 urge the center region forward as the electrode surfaces are advanced against the heart.

1 8. A device as in claim 7, further comprising a spring attached to the
2 distal end of the support to provide a spring loaded advancement of the fixed rod.

1 9. A device as in claim 1, wherein at least one of the electrode surfaces of
2 the electrode structure comprises a plurality of electrically isolated segments and wherein the
3 support includes separate electrical conduction paths for connecting the isolated segments of
4 the electrode structure to an external power supply controller.

1 10. A device as in claim 1, wherein the support comprises a first
2 electrically conductive path for connecting the electrode surface on the planar region to an
3 external power supply controller and a second electrically conductive path isolated from the
4 first path for connecting the electrode surface of the center region to the external power
5 supply controller.

1 11. A system comprising:
2 a support;
3 an electrode structure deployable from the support, said electrode structure
4 including a planar region and a conformable, raised center region, wherein electrode surfaces
5 on the planar region and on the center region are electrically isolated from each other;
6 a power supply controller; and
7 wherein the support comprises a first electrically conductive path for
8 connecting the electrode surface on the planar region to the external power supply controller
9 and a second electrically conductive path isolated from the first path for connecting the
10 electrode surface of the center region to the external power supply controller.

1 12. A system as in claim 11, further comprising a paired counter electrode.

1 13. A system as in claim 12, further comprising a switch on the power
2 supply controller to allow a user to switch the mode of operation between bipolar functioning
3 for sensing or pacing treatment and unipolar functioning for defibrillation treatment.

1 14. A cardiac electrode deployment device comprising:
2 a support having a proximal end, a distal end, and a blunt tip;
3 a first electrode structure deployable from the distal end of the support, said
4 first electrode structure including a planar region; and

5 a second electrode structure attached to the blunt tip, said second electrode
6 structure having a conformable, raised center region, wherein electrode surfaces on the first
7 and second electrode structures are electrically isolated from each other.

1 15. A device as in claim 14, wherein the first electrode structure comprises
2 an electrically conductive base and the second electrode structure comprises an electrically
3 conductive dome.

1 16. A device as in claim 15, wherein the electrically conductive base is a
2 compliant web and the conductive dome is a soft matrix or mesh disposed over the blunt tip.

1 17. A device as in claim 16, wherein the first electrode structure comprises
2 a plurality of struts reciprocatably attached to the distal end of the shaft, said struts being
3 retractable to a radially contracted configuration and advancable along arcuate, diverging
4 paths to deploy the first electrode surface to non-traumatically engage the heart when
5 advanced thereagainst, wherein the compliant web is secured to the struts to advance the first
6 electrode surface when the struts are advanced.

1 18. A device as in claim 17, wherein the compliant web is supported solely
2 by the struts and the dome is supported solely by the blunt tip.

1 19. A device as in claim 18, wherein the blunt tip extends from the most
2 distal end of the shaft by a rod.

1 20. A device as in claim 19, wherein the blunt tip is formed from a soft,
2 biocompatible foam.

1 21. A device as in claim 19, wherein the blunt tip is formed entirely from a
2 soft conductive mesh.

1 22. A device as in claim 19, further comprising a force gauge,
2 accelerometer, impedance sensor, piezoelectric crystal, or oximeter coupled to the blunt tip or
3 dome.

1 23. A method for electrically contacting a heart, said method comprising:
2 percutaneously introducing an electrode structure against the heart;

3 establishing a first electrically conductive path to the heart through a first
4 electrode surface on a planar region of the electrode structure;
5 establishing a second electrically conductive path to the heart through a
6 second electrode surface on a raised center region of the electrode structure, wherein the first
7 and second electrode surfaces are electrically isolated from each other; and
8 establishing an electrical circuit between the first and second electrically
9 conductive paths.

1 24. A method as in claim 23, wherein establishing a circuit comprises
2 taking an EKG of the heart.

3 25. A method as in claim 23, wherein establishing a circuit comprises
4 pacing the heart.

5 26. A method as in claim 23, wherein establishing a circuit comprises
6 applying energy in a bipolar fashion through the first and second isolated electrode surfaces.

7 27. A method as in claim 23, wherein establishing the first electrically
8 conductive path comprises engaging an electrically conductive compliant web against the
9 heart and establishing the second electrically conductive path comprises engaging a soft
dome-like matrix coupled to and projecting from the web against the heart.

1 28. A method as in claim 27, further comprising advancing the dome-like
2 matrix to protrude distally of the compliant web.

3 29. A method as in claim 23, wherein the first electrically conductive path
4 comprises engaging an electrically conductive compliant web against the heart and
5 establishing the second electrically conductive path comprises engaging a soft dome-like
6 matrix disposed over a blunt tip against the heart.

7 30. A method as in claim 29, wherein introducing the electrode structure
8 comprises bluntly dissecting intercostal tissue with the blunt tip.

9 31. A method as in claim 23, further comprising compressing the heart by
contacting the electrode structure against the heart and pressing the electrode structure to
cause compression of the heart.

1 32. A method as in claim 31, wherein compression is in an anterior-
2 posterior direction.

1 33. A method as in claim 31, wherein the electrode structure is introduced
2 intercostally in a low profile configuration and subsequently expanded over the heart.

1 34. A method as in claim 31, wherein compressing the heart comprises
2 repetitively compressing the heart at from 40 to 160 repetitions per minute.

1 35. A method as in claim 23, further comprising contacting a patient's
2 back with a counter electrode and applying defibrillation energy between the electrode
3 structure on the heart and the counter electrode on the patient's back to defibrillate the heart.

1 36. A method as in claim 35, wherein applying defibrillation energy
2 comprises switching the mode of operation on a power supply connected to the electrode
3 structure and the counter electrode.

1 37. A kit comprising;
2 a cardiac electrode deployment device; and
3 instructions for use setting forth a method according to claim 23.

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